New tool assesses structural health of objects

March 7, 2019

Understanding how cars, planes, bridges and other structures handle vibrations and dynamic loads can be critical to their design and performance. Researchers at Los Alamos National Laboratory have developed a revolutionary new way to measure the response of civil, mechanical and aerospace structures to dynamic loads and analyze their structural health.

Known as Video-Based Dynamic Measurement & Analysis (ViDeoMAgic), the technology won a 2018 R&D 100 award and works by taking a video of a vibrating structure and extracting detailed structural vibration/dynamics information, such as displacement time histories, natural frequencies, damping ratios and mode shapes.

Unsupervised machine learning algorithms then analyze those dynamic responses and extract the structure's dynamics properties (resonant frequencies, damping & mode shapes) from the video data — which in turn can be used to assess the system's health (with respect to damage and defects).

Unable to load contents of IFRAME at this location in the original document. See original HTML document and notify an administrator.

This technology's high fidelity, *in situ* damage detection of civil, mechanical and aerospace structures enables identification and remedy of incipient damage before it becomes critical and leads to costly repairs, delays and even deaths.

Yongchao Yang of the Lab's National Security Education Center's Engineering Institute led the team of David Mascareñas, Charles Dorn, Charles Farrar, and Garrett Kenyon on the project.